

REMARKS

Claims 19-34 are pending. By the present Amendment, claims 19, 20, 27 and 28 have been amended to delete the text “of the type” and, accordingly, to overcome the objection under 35 U.S.C. § 112, second paragraph, set forth in the Office Action. A Transmittal of Formal Drawings is being filed concurrently herewith.

In the Office Action, claims 19-32 are rejected under 35 U.S.C. § 102(e) [sic] as being anticipated by U.S. Patent No. 5,345,440, to Gledhill et al (hereinafter referred to as the Gledhill et al patent). Applicants respectfully traverse this basis for rejecting the claims.

The Applicants wish to point out that the Gledhill et al patent is based on an International PCT application no. WO 9205646 which was cited in the International Preliminary Examination Report (IPER), copy attached, provided in the International PCT application corresponding to the present application. The IPER acknowledged the patentability of the subject matter claimed in the corresponding International PCT application (e.g., using “a phase difference modulation in the frequency axis rather than the time axis”) over the Gledhill et al patent.

The Gledhill et al patent discloses a method for receiving orthogonal frequency division multiplex (OFDM) signals. As stated in column 2, lines 42 to 47 of the Gledhill et al patent, data are preferably differentially coded. Unlike the present invention, however, the Gledhill et al patent teaches a differential coding in the direction of the time axis rather than a differential coding in the direction of the frequency axis. The differential coding in the time axis is also described in column 6, lines 54 to 61 of the Gledhill et al patent, which state that the transitions between successive phase states define two data bits being coded. Moreover, column 9, lines 21 to 23 state that, for differentially coded data, it is the transitions between successive values of the data which define the desired data to be demodulated.

The independent claims 19, 20, 27 and 28 each recite that each symbol is defined by phase differences between simultaneous carriers having different frequencies. This is specific for differential coding in the direction of the frequency axis. Thus, the subject matter of the independent claims of the present invention is

clearly not anticipated by the Gledhill et al patent, which discloses OFDM signals differentially coded in the direction of the time axis as discussed above. Withdrawal of the rejection of claims 19-32 as being anticipated by the Gledhill et al patent under 35 U.S.C. § 102 is respectfully requested.

In the Office Action, claims 33 and 34 are rejected under 35 U.S.C. § 103(a) as being obvious over the Gledhill et al patent in view of U.S. Patent No. 6,219,333, to Ahn et al (hereinafter referred as the Ahn et al patent). The Gledhill et al patent does not disclose or suggest providing an OFDM signal in which each symbol is defined by phase differences between simultaneous carriers having different frequencies, as recited in the independent claims 19, 20, 27 and 28. Further, there is no motivation to modify the system disclosed in the Gledhill et al patent to make use of a differential coding in the direction of the frequency axis, since the apparatus for receiving OFDM signals as taught by the Gledhill et al patent is developed for OFDM signals differentially coded in the direction of the time axis. Using OFDM signals differentially coded in the direction of the frequency axis would require a different receiver that is not disclosed or suggested by the Gledhill et al patent. Such a receiver requires means for performing a de-mapping in the frequency axis, as well as a means for performing a de-mapping in the time axis. The Gledhill et al patent merely teaches recovery of the encoded data and fine-frequency synchronization by performing a de-mapping in the time axis.

The Ahn et al patent does not overcome the deficiencies of the Gledhill et al patent. The Ahn patent relates to a system for synchronizing a carrier frequency of an OFDM transmission system which uses one of the multiple carrier modulation methods (see column 1, lines 25 to 27 of the Ahn patent). The Ahn patent is silent regarding a differential coding in the direction of the frequency axis, that is, it is silent regarding signals having symbols being defined by phase differences between simultaneous carriers having different frequencies as defined in the independent claims of the present application. Moreover, according to the Ahn patent, for fine frequency synchronization, a pilot signal is extracted from the carrier, a phase difference between the extracted pilot signal and a previously extracted pilot signal

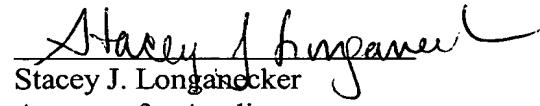
Appl. No. 09/673,270
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Reply to Office Action of June 23, 2004

which is delayed for a duration of one symbol is calculated, and the prime part of the carrier frequency offset within a predetermined frequency is corrected by controlling a gain of the calculated phase difference (see column 2, lines 27 to 33 of the Ahn patent). The phase difference between the pilot signals which are transmitted in the same subchannel between the adjacent two symbols is proportional to the carrier frequency offset (see column 7, lines 46 to 49 of the Ahn patent).

According to the Ahn patent, pilot signals are used for deriving a phase difference based on which a carrier frequency offset is determined. As stated in the Amendment dated February 23, 2004, it is not necessary to eliminate any phase shift uncertainties related to the transmitted information since pilot signals are not provided for transmitting information but have properties which are known at the transmitter's end and at the receiver's end. Accordingly, it is clear that the Ahn patent does not disclose or suggest an M-PSK decision device as claimed since such a device is not necessary in the system described in the Ahn patent. Thus, the claimed subject matter is also not suggested by the Ahn patent. Accordingly, withdrawal of the rejection of claims 33 and 34 as being obvious under 35 U.S.C. § 103(a) over the Gledhill et al patent in view of the Ahn et al patent is respectfully requested.

In view of the above, it is believed that the application is in condition for allowance and notice to this effect is respectfully requested. Should the Examiner have any questions, the Examiner is invited to contact the undersigned at the telephone number indicated below.

Respectfully Submitted,


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